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Maritime Sanitation

*Inaugurated and brought to its present state of
Perfection by the*

Louisiana State Board of Health.

Model exhibited at the World's Columbian
Exposition, Chicago, 1893.

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THE QUARANTINE SYSTEM OF LOUISIANA.

MODEL EXHIBITED BY THE LOUISIANA STATE
BOARD OF HEALTH AT THE WORLD'S COLUM-
BIAN EXPOSITION, CHICAGO, 1893.

INTRODUCTORY.

Before entering into a detailed description of this model, representing the plant and apparatus for disinfection and fumigation now in use at the Mississippi River Quarantine Station below New Orleans, it may be well to refer briefly to the principles of sanitation on which this system is based.

The "germ theory" of the origin and propagation of infectious disease is so well understood and so generally accepted by the enlightened public, that it will probably be sufficient to state in this connection that it is against the *germ* alone that modern sanitary science urges the warfare of quarantine.

The old system of arbitrary detention for a long period, with its useless and ruinous methods of treating baggage, and all the hardships inflicted upon passengers is, happily, a thing of the past.

The improved system, as operated by the Louisiana State Board of Health, aims at the complete destruction of all germs of disease, wherever existing, with the least injury to private property and the minimum of detention to vessels and passengers.

Under this system, persons need only be detained long enough to cover the known period of incubation of the diseases quarantined against, dating from the last exposure. With vessels subject to quarantine, but on which no infectious disease has occurred, the detention for yellow fever is usually three days after the completion of disinfection.

Where infectious disease is present, no absolute rule can be observed, but the time of detention is made to date from the last disinfection after removal of the sick, and is made sufficiently long to insure safety.

The Mississippi River Station has for its primary objects:

1st.—The purification of the vessel itself, and

2nd.—The disinfection of all clothing, bedding, and other “fomites” which might serve to convey the infection, including any suspicious articles carried as cargo.

The first object embraces the following requirements:—

(a) The purification of the atmosphere contained within the holds and living apartments by fumigation with freshly generated sulphur fumes (sulphur dioxide.)

(b) The washing of floors, walls and ceilings, with a disinfecting solution Bi-Chloride of Mercury.

(1 part bichloride of mercury, 2 parts hydrochloric acid and 800 parts of water.)

(c) The removal of water-ballast and bilge water, and the disinfection of tanks and spaces from whence such water has been pumped.

(d) The disinfection of any hard ballast, such as granite (earth ballast being no longer allowed.)

The second object, that of disinfecting without damaging clothing and the “fomites” in which the germs of disease are so often carried, is the one which has most severely taxed the ingenuity of sanitarians, and which has been most successfully accomplished in the improved system illustrated by this model.

DESCRIPTION OF MODEL, AND METHOD OF OPERATIONS.

This exhibit, prepared at the solicitation of the management of the Columbian Exposition, is designed to illustrate the practical working of the Louisiana System of Maritime Sanitation, but being restricted as to space, it has been found impracticable to have the various parts of the model in exact proportion, as they exist in the actual plant.

Thus, the steamship and tugboat appear unduly small, so as not to obstruct the view from the front, while the car and sulphur furnace on the wharf are of exaggerated dimensions, in order to show the internal arrangement of the furnace to better advantage. In all essential particulars, however, the model faithfully represents the working plant as it now exists.

Preparatory to beginning the work of fumigation and disinfection, the vessel for treatment is moored alongside of the wharf, as shown in the exhibit. If the holds contain any cargo it may be necessary to remove a sufficient quantity to make an opening under each hatch-way, large enough to allow the fumigating pipes to reach to the bottom of the vessel.

There are two sulphur furnaces, one on board of the tug, and the other on a car running along the front of the wharf, which can be placed opposite any hatch where it is desired to operate, thus greatly facilitating the work of fumigation.

Each furnace is provided with a rotary suction blower, driven by a steam engine, by means of which the air from inside the vessel is drawn through a large galvanized iron jointed pipe, so placed as to reach the hatch-ways, is then forced to pass over large pans of burning sulphur in the upper part of the furnaces, and thus purified both by heat and direct admixture with the freshly generated *sulphur dioxide*, is returned through another pipe to the lower part of the hold.

In this process the oxygen of the air is almost completely converted in sulphur dioxide, the proportion of the latter gas averaging about 18 per cent.

In this model, the internal construction of the furnace is shown in the one situated on the car, having a movable front, and it will be seen that the coal fire by which the sulphur is heated to the point of ignition is below and quite shut off from the fumigating chamber, thus securing purity of the gas generated and a correspondingly high degree of efficiency in its action.

To prevent the possible passage of particles of burning sulphur into the hold of the vessel, the outlet pipe from the furnace is led down to within six inches of the bottom of a large square iron box floored with cement, from near the top of which the fumigated air is drawn by the suction blower and driven through a considerable length of eight inch pipe into the hold of the vessel.

The solution used for disinfecting purposes is Bichloride of Mercury (given above) and is contained in the tank placed upon the roof of the building, from whence it is led through wooden tubes under strong

hydrostatic pressure to a number of stop-cocks provided with rubber hose along the front of the wharf, by means of which it can be readily applied to such parts of the vessel as it may be desired to disinfect. In the model, these stop-cocks are seen just inside of the mooring posts.

This disinfecting solution is applied freely to the woodwork of the vessel with the view of destroying any germs that may be present. It is also used to disinfect certain kinds of articles as, for instance, rubber and leather goods, which would be injured by heat.

“For the disinfection of bilges and water-ballast tanks, crude carbolic acid or copperas may be used. In iron vessels it is usually sufficient to wash out the tanks.”

While the work of fumigation is in progress, all clothing, bedding, and other “fomites” will have been subjected to treatment by heat in the large steel cylinders, [eight feet in diameter and fifty feet long] of which there are three arranged side by side with their open ends facing the vessel. Each of these cylinders is provided with 120 interrupted coils of pipe, aggregating 155520 square inches of heating surface placed just inside of the shell, and connected with a large steam pipe running lengthwise along the bottom.

A smaller pipe, perforated with numerous holes, also extends the length of the cylinder and is provided with a valve, by means of which live steam can be admitted at will.

The clothing and other articles to be disinfected are placed on racks suspended from a carriage which runs on an overhead railway within the cylinders. This railway projects in front of each cylinder far enough to allow the carriages being run out their full length. A light covering of canvas protects the articles from any accidental dripping of water, and a wire net underneath is so placed as to catch any small object that might drop from the racks.

After the racks have been run in the doors are swung shut and hermetically closed (by means of a packing joint and swinging clamps) after which steam is admitted to the coils, raising the temperature of the enclosed air within a short time to about 190 degrees (Fahren-

heit.) After this heat has been reached, as shown by the thermometer attached to the cylinder, live steam is allowed to enter through the perforated pipes, thus rapidly raising the temperature to 230 degrees (Fahrenheit) under a pressure of seven pounds, at which point the safety valve opens, preventing any danger of explosion. After about thirty minutes, the doors are opened, the racks run out and the disinfected articles removed.

These articles dry almost instantly and it has been found that not even the most delicate fabrics are injured, while the desideratum of thorough destruction of all disease germs is fully attained.

The boiler for generating steam stands just in the rear of the cylinders and need not be specially described.

Articles of rubber and leather which would be injured by steam heat are either disinfected with Bichloride solution or fumigated in the special fumigating chamber shown on the wharf. The dressing rooms shown on either side of the wharf are used by the passengers and crews of vessels in changing their clothing, every article of wearing apparel being thus systematically subjected to disinfection.

The details of this work are carefully and thoroughly carried out by a trained corps of assistants, under the direction of an experienced superintendent.

The steam winch shown on the wharf, is designed for pulling the racks out of the cylinders, but can be used for moving vessels and other purposes.

LOCATION OF QUARANTINE STATIONS AND GENERAL PLAN OF QUARANTINE WORK PERFORMED BY THE LOUIS- IANA STATE BOARD OF HEALTH.

The Mississippi River Quarantine Station is situated on the East bank of the River, about ninety miles below New Orleans. The "Lazzaretto" Station, to which are sent vessels having infectious sickness on board, is four miles further down

on "Pass-a-l'Outre," an unused outlet of the river, and one and a half mile away from the main channel.

A quarantine physician is also permanently stationed at Port Eads, or South Pass, 106 miles below New Orleans, the principal entrance for sea going craft, with the duty of examining into the health of all incoming vessels.

Inspection Stations are likewise maintained near Morgan City on the Atchafalay river, near Lake Charles on the Calcasieu river and at the Rigolets Pass, the entrance to lake Pontchartrain.

The physicians on duty at these stations have, as a rule, only to deal with small coasting vessels. Should a vessel calling for quarantine treatment arrive at any one of them, she would be ordered to the Mississippi River Station.

In addition to this work, carried on in its own territory, the Louisiana Board of Health also maintains a system of medical inspection from May 1st to November 1st, in various States and countries of Central and South America, with which New Orleans has trade relations. In order to secure prompt and reliable information as to the health of those regions, physicians from Louisiana, appointed by the Board, are stationed at Santa Marta, U. S. C.; Bocas del Toro, U. S. C.; Port Limon, Costa Rica; Bluefields, Nic.; Puerto Cortez, Sp. Honduras; Ceiba, Sp. Honduras; Livingston, Guatemala and Belize, Br. Honduras.

Through the operation of this complete system of quarantine work, the Board has succeeded in keeping out foreign pestilence, and at the same time has fostered the commerce of its State and section to a gratifying extent.



